

# NOTES ON THE NATURE AND TREATMENT OF FLAT-FOOT.

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I HAVE myself personally suffered from an extreme condition of flat-foot, the result of an accident twenty-two years ago. My recovery, long since practically complete, was the result of a six-months' application of principles which I had, after anxious study, myself determined. This is my apology for now offering these notes, suggested by Mr Miller's paper in the November number of this Journal.

To relate my own personal case would be to tell an oft-told tale<sup>1</sup>. To point out wherein I differ from Mr Miller and other writers would be an uncongenial task. I prefer to set forth the guiding principles which have, for many years, directed my treatment of flat-foot. These I have never before fully formulated.

(1.) The foot is supported not only *in* but also *by* the exercise of its functions. The muscles, which by action move, in action sustain the structure. In early life they also develop the form.

(2.) Ligaments are insufficient to resist tension when continuous or prolonged. On the other hand, intermittent tension promotes their strength.

(3.) Muscles, developed by action, tend to remain taut and firm when not in action, and so, by keeping up continuous pressure, modify the bony contours.

(4.) As failure of muscular support tends to deformity from yielding of ligaments, so a renewal of it, in specially active degree, will renew the form.

(5.) In good walking the heel is raised from the ground by the calf muscles and by the long flexors, acting, with the peronci and tibialis posticus, at the same time.

(6.) While the long flexor muscles press the toes against the ground, they tend to lift up the heads of the metatarsal bones (forming the anterior pillar of the arch), which thus dance, so to

<sup>1</sup> *Lancet*, February 9, 1884, and September 25, 1886. *Brit. Med. Journ.*, June 30, 1888.

speaking, on tight ropes. Injurious pressure against the ground is thus prevented, when the weight is borne by the anterior pillar only.

(7.) This same action relieves all strain on the ligaments beneath the tarsus while drawing the two pillars towards each other and throwing the arch upwards, just as tightening a bow-string increases the bending of the bow.

(8.) In flat-foot the indication is to promote this bow-string or tie-rod action by vigorously springing to tip-toe both as a special exercise and in walking. Avoidance of continuous strain on the ligaments, as in careless standing, is also indicated.

(9.) While frequent rising to tip-toe during any necessary standing is desirable, prolonged standing, even in the tip-toe position, is not desirable. In this latter case the muscles are wearied by continuous contraction, and the ligaments lose the benefit of intermittent tension. It is the act, the movement, of rising to tip-toe that is beneficial.

(10.) As in order to have free movement upwards the heel must first completely descend to the ground, heels to the boots should be avoided.

(11.) The mechanism of the foot is best adapted for a level surface. The sole of the foot, therefore, must not be thickened on the inner side, as sometimes advised.

(12.) As the free bending of the foot necessary for efficient function takes place only, or mainly, at the oblique line of the metatarsophalangeal joints, a thick sole is altogether inadmissible.

(13.) The short flexor muscles, acting with the abductors and adductors, play an important part in holding down the proximal phalanx of the first and the middle phalanx of each of the smaller toes, while the long flexors act on the terminal phalanges.

(14.) The principal object of the arch being, as I contend, to protect these sole muscles from pressure, steel springs, cork or other pads, which press against them are to be scrupulously avoided.

(15.) The great toe having its natural plane of movement obliquely downwards and inwards (away from the others), it is important that all interference with this lateral movement should be avoided, otherwise the action of its flexors may be suspended.

(16.) In such case the bow-string or tie-rod effect of the action of the long flexor on the tarsal arch is lost. In this regard I attach nearly as much importance to proper socks as to proper boots.

(17.) As the arch is most pronounced and best adapted to sustain weight, and as the muscles for raising the heel and pressing down the toes act best, when the toes are directed slightly inwards, the toes should never be turned outwards in standing or in walking.

(18.) Free movement of the feet being impossible when the body rests on their outer edges, standing or walking in that position is not to be permitted.

(19.) As muscles when tired tend to as little action as possible,

and so to throw extra strain upon the ligaments, all fatigue is to be avoided.

(20.) Inspiration, straightening of the spine and knee, throwing of the arms upwards, and of the head backwards, are all of them movements instinctively associated with the act of rising to extreme tip-toe. All these tend to throw the body, as a whole, into good position. Therefore, any exercise or form of work which involves springing upwards with every inspiration, coming downwards with every expiration (such as wood-cutting), should be encouraged. All exercise or work which involves continuous effort (such as holding up weights) is to be avoided, especially if it involve the squatting position.

Thus, as I contend, good walking and many forms of work are not only compatible with the cure of flat-foot, but may be used as a direct influence to that end. They who walk well will never be flat-footed, and they who are flat-footed—I am not now speaking of cases of bony ankylosis in the deformed position—may, by walking well, be cured. I *know* what took place in my own foot, and I have seen cases which, as I have reason to believe, would have been the subjects of osteotomy had they fallen into the hands of more enterprising surgeons. I have seen those cases get perfectly well, and yet the patients have not left their occupations for a single day.

If it could be shown that muscular action is not necessary to maintain, nor potent to restore when destroyed, the flattened arch, then, as I should have to admit, all the physiology of the feet which I have laid down in my book,<sup>1</sup> produced after many years of careful study, would be worthy only of contemptuous disregard.

If, however, surgeons will disregard that which, in my view, is the true physiology of the feet, and treat flat-foot by propping it up with a pad or spring; and if others prefer to readjust it by cutting out a bone, as one too many, or by fixing that which should be a joint by destroying the joint surfaces; in such cases I can only say—let it not be called a cure.

John Hunter, speaking of cancer, said<sup>2</sup>—"For what I call a cure is an alteration of the disposition and of the effect of that disposition, and not the destruction of the cancerous parts." If then, as a consequence of defective function, we have a deformity, and if, by vigorously renewing the function, we remove at once both the deformity and the disposition thereto, that is a cure indeed. Such result in cases of flat-foot I have, over and over again, had the satisfaction of seeing, when I knew that no remedial treatment had been used other than to restore the defective function by proceeding on the lines which I have endeavoured to indicate.

<sup>1</sup> *The Human Foot*. Churchill, 1889.

<sup>2</sup> Quoted by Sir Spencer Wells in his Morton Lecture.

